

Amendments To The Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously presented): An image generating method, including:
regarding original moving pictures as two-dimensional images that vary along a time axis, and when the moving pictures are expressed, in a virtual manner, as a box space formed by the two-dimensional images and the time axis, cutting the box space by a surface that contains a plurality of points each of which differs from the other in time value, wherein the cutting the box space is performed by a processing unit based apparatus;
projecting a first image that appears on the cut surface onto a first plane perpendicular to the time axis;
varying the cut surface in time;
projecting a second image that appears on the varied cut surface onto a second plane perpendicular to the time axis; and
outputting the first and second images appearing on the first and second planes as new moving pictures.

2. (Original): An image generating method according to Claim 1, wherein varying the cut surface in time is realized by moving the surface along the time axis.

3. (Original): An image generating method according to Claim 1, wherein the surface is defined by a function of coordinates of points contained in the two-dimensional images.

4. (Currently amended): An image generating apparatus, including:

an image memory which sequentially stores original moving pictures along a time axis;
an image conversion unit which regards the original moving pictures stored in said image memory as two-dimensional images that vary along time axis and, when the moving pictures are expressed, in a virtual manner, as a box space formed by the two-dimensional images and the time axis, cuts the box space by a surface that contains a plurality of points each of which differs from the other in time value, and which projects an image that appears on the cut surface onto a plane perpendicular to the time axis; and

an image data output unit which outputs, as new moving pictures,~~sets to a new moving-picture frame~~ the images appearing on the plane obtained by varying the cut surface in time in said image conversion unit such that:

said image data output unit outputs, as the new moving pictures, a first image obtained by projecting the image that appears on the cut surface onto a first plane perpendicular to the time axis and a second image obtained by projecting the image that appears on the varied cut surface onto a second plane perpendicular to the time axis.

5. (Original): An image generating apparatus according to Claim 4, wherein said image conversion unit realizes varying the cut surface in time by moving the surface along the time axis.

6. (Original): An image generating apparatus according to Claim 4, wherein the surface is defined in a manner such that the surface has continuous or discrete width in the direction of the time axis, and said image conversion unit synthesizes images covered within the width.

7. (Original): An image generating apparatus according to Claim 4, wherein said image conversion unit cuts the box space by a surface defined by a function of coordinates of an image region constituting the two-dimensional image.

8. (Original): An image generating apparatus according to Claim 7, wherein the surface is defined by a function which does not depend on a horizontal coordinate of the two-dimensional

image.

9. (Original): An image generating apparatus according to Claim 4, wherein said image conversion unit cuts the box space by a surface which is defined by a function of attribute values for an image region constituting the two-dimensional image.

10. (Original): An image generating apparatus according to Claim 4, further including a setting input unit which acquires, via a user operation, input of a setting value used to define the surface, wherein said image conversion unit cuts the box space by the surface defined by a function of the setting value acquired by said setting input unit.

11. (Original): An image generating apparatus according to Claim 10, wherein the function of the setting value acquired by said setting value input unit is expressed by a curve that indicates a relation between coordinates of points contained in the two-dimensional images and time values thereof when a relation between the function of the setting value and a variable of the function is displayed on a screen.

12. (Original): An image generating apparatus according to Claim 10, wherein said setting input unit acquires, as the setting value, coordinates of characteristic points in the two-dimensional images, and wherein said image conversion unit cuts the box space by a curve defined by a function of the coordinates of the characteristics points.

13. (Original): An image generating apparatus according to Claim 4, wherein said image conversion unit partially changes a rate of the new moving-picture frame to be outputted from said image data output unit in a manner such that, according to attribute values of image regions that constitute the two-dimensional images, the cut surface is varied in time with different speed for each of the image regions.

14. (Original): An image generating apparatus according to Claim 4, wherein the time

value that defines the surface includes at least one of a past or a future with the present time being a center thereof.

15-21. (Canceled).

22. (Currently amended): An image generating apparatus which includes an image memory, an image conversion unit and an image data output unit,

wherein said image memory records, in sequence, original moving pictures for each frame,

wherein said image conversion unit regards original moving pictures stored in said image memory as two-dimensional images that vary along a time axis, and, when the moving pictures are expressed, in a virtual manner, as a box space formed by the two-dimensional images and the time axis, cuts the box space by a surface that contains a plurality of points each of which differs from the other in time value, and projects an image that appears on the cut surface onto a plane perpendicular to the time axis, such that:

said image conversion unit determines, for each in-picture position of an image contained in a target frame, a plurality of frames at predetermined time intervals from the frames recorded in said image memory, and

said image conversion unit creates the image that appears on the cut surface by reading[[s]] out, from the plurality of frames, data that correspond to the in-picture position and synthesizing[[es]] the data at an alpha value according to an attribute value thereof, for each in-picture position, and

wherein said image data output unit outputs, as new moving pictures, the images that appear on the perpendicular surface by varying the cut surface in time, such that:

said image data output unit sequentially outputs, as the new moving pictures, the target frame synthesized and reconstructed by said image conversion unit along a time axis a first image obtained by projecting the synthesized image appearing on the cut surface onto a first plane perpendicular to the time axis and a second image obtained by projecting the synthesized image appearing on the varied cut surface onto a second plane perpendicular to the time axis.

23. (Canceled).

24. (Currently amended): An image generating apparatus which includes an image memory, an image conversion unit and an image data output unit,

wherein said image memory records, in sequence, original moving pictures for each frame,

wherein said image conversion unit regards original moving pictures stored in said image memory as two-dimensional images that vary along a time axis, and, when the moving pictures are expressed, in a virtual manner, as a box space formed by the two-dimensional images and the time axis, cuts the box space by a surface that contains a plurality of points each of which differs from the other in time value, and projects an image that appears on the cut surface onto a plane perpendicular to the time axis, such that:

said image conversion unit creates the image that appears on the cut surface by reading[[s]] out, for each in-picture position of an image contained in a target frame, data that correspond to the in-picture position from a frame temporally displaced from the target frame by an amount determined by an attribute value of the in-picture position, and then synthesizing[[es]] the data at an alpha value according to the attribute value, and

wherein said image data output unit outputs, as new moving pictures, the images that appear on the perpendicular surface by varying the cut surface in time, such that:

said image data output unit ~~sequentially outputs, as the new moving pictures, the target frame reconstructed by synthesis along a time axis~~ a first image obtained by projecting the synthesized image appearing on the cut surface onto a first plane perpendicular to the time axis and a second image obtained by projecting the synthesized image appearing on the varied cut surface onto a second plane perpendicular to the time axis.

25. (Previously presented): An image generating apparatus according to Claim 24, wherein the target frame or the at least one of frames is at least one of a previous frame in time or a subsequent frame in time with respect to a reference frame which should have been

naturally outputted by said image data output unit from said image memory.

26. (Previously presented): An image generating apparatus according to Claim 24, wherein, for each in-picture position of the images contained in the target frame, said image conversion unit adds a predetermined pixel value in accordance with an attribute value thereof.

27. (Original): An image generating apparatus according to Claim 9, wherein the attribute value is a depth value.

28. (Previously presented): An image generating apparatus according to Claim 22, wherein the attribute value is a depth value.

29. (Original): An image generating apparatus according to Claim 9, wherein the attribute value is a value that indicates the order of approximation relative to a desired image pattern.

30. (Previously presented): An image generating apparatus according to Claim 22, wherein the attribute value is a value that indicates the order of approximation relative to a desired image pattern.

31. (Original): An image generating apparatus according to Claim 9, wherein the attribute value is a value that indicates a degree of change of an image area in time.

32. (Previously presented): An image generating apparatus according to Claim 22, wherein the attribute value is a value that indicates a degree of change of an image area in time.

33. (Original): An image generating apparatus according to Claim 9, wherein the attribute value is a pixel value.

34. (Previously presented): An image generating apparatus according to Claim 22, wherein the attribute value is a pixel value.

35. (Original): An image generating apparatus according to Claim 4, further including an image input unit which acquires, as the original moving pictures, images shot by a camera and sends the images to said image memory.

36. (Previously presented): An image generating apparatus according to Claim 22, further including an image input unit which acquires, as the original moving pictures, images shot by a camera and sends the images to said image memory.

37. (Previously presented): An image generating apparatus according to Claim 22, further including a setting input unit which acquires, via a user operation, input of a setting value used to determine the at least one of frames, wherein said image conversion unit determines the at least one of frames according to the setting value acquired by said setting input unit.

38. (Previously presented): An image generating apparatus according to Claim 37, wherein the setting value acquired by said setting input unit is expressed by a curve that indicates a relation between coordinates of points contained in the two-dimensional images and time values thereof when displayed on a screen.

39. (Previously presented): An image generating apparatus according to Claim 37, wherein said setting input unit acquires, as the setting value, coordinates of characteristic points in the two-dimensional images and wherein said image conversion unit determines the at least one of frames according to the coordinates of the characteristic points.

40. (Currently amended): A non-transitory computer readable medium encoded with a computer program, the computer program including the functions of:
regarding original moving pictures as two-dimensional images that vary along time axis,

and when the moving pictures are expressed, in a virtual manner, as a box space formed by the two-dimensional images and the time axis, cutting the box space by a surface that contains a plurality of points each of which differs from the other in time value;

projecting a first image that appears on the cut surface onto a first plane perpendicular to the time axis;

varying the cut surface in time;

projecting a second image that appears on the varied cut surface onto a second plane perpendicular to the time axis; and

outputting the first and second images appearing on the first and second planes as new moving pictures.

41. (Currently amended): A non-transitory computer readable medium encoded with a computer program, the computer program configured to perform steps comprising:

recording, in sequence, original moving pictures in a memory for each frame;

determining, for a first in-picture position of a first image contained in a first target frame, a first plurality of frames at predetermined time intervals from the frames recorded in said memory, and reading out, from the first plurality of frames, first data that correspond to the in-picture position;

synthesizing the first data with the first target frame to be output at an alpha value according to an attribute value thereof, for each in-picture position;

determining, for a second in-picture position of a second image contained in a second target frame, a second plurality of frames at predetermined time intervals from the frames recorded in said memory, and reading out, from the second plurality of frames, second data that correspond to the in-picture position; and

synthesizing the second data with the second target frame to be output at an alpha value according to an attribute value thereof, for each in-picture position;

wherein said determining, said reading-out and said synthesizing regard original moving pictures stored in said memory as two-dimensional images that vary along a time axis, and, when the moving pictures are expressed, in a virtual manner, as a box space formed by the two-

dimensional images and the time axis, cutting the box space by a surface that contains a plurality of points each of which differs from the other in time value, and projecting an image that appears on the cut surface onto a plane perpendicular to the time axis,

the program further configured to perform steps comprising:

forming new moving pictures by sequentially outputting at least the first and second synthesized frames along a time axis,

wherein said forming outputs, as new moving pictures, the images that appear on the perpendicular surface by varying the cut surface in time.

42. (Canceled)

43. (New): An image generating apparatus according to Claim 4, wherein the first plane and the second plane coincide with each other.

44. (New): An image generating apparatus according to Claim 22, wherein the first plane and the second plane coincide with each other.

45. (New): An image generating apparatus according to Claim 24, wherein the first plane and the second plane coincide with each other.